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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,720	04/13/2004	Masahiko Okunuki	0862.023536	3027

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EXAMINER	
BERMAN, JACK I	

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/822,720	OKUNUKI ET AL.	
	Examiner	Art Unit	
	Jack I. Berman	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ooaeh et al. in view of Lempert et al. and Pfeiffer et al. As was explained in the previous Office action, Ooaeh et al. discloses an electron beam exposure apparatus comprising: an electron gun (114) including a cathode portion (111) which emits electrons, an anode portion (113, 41) which accelerates the emission of electrons, a bias portion (grid or Wehnelt electrode 112) which is arranged between said cathode portion and anode portion and controls the trajectories of the emitted electrons, a shielding portion (beam-cutting-off aperture 411) which is arranged below said anode portion and shields some of the emission electrons, and a cooling portion (430 in Figure 17) which cools said shielding portion; and a stage (135) which moves in holding a substrate to be exposed by using the emission electrons. Ooaeh et al. also inherently teaches to use this apparatus to expose a substrate for subsequent development. Furthermore, as was also

explained in the previous Office action, Figure 17 of Ooaeh et al. suggests that the shielding portion (411) and the cooling portion (430) are separable, and at lines 56-59 in column 17 Ooaeh et al. teaches that the shielding portion should be made of Mo (molybdenum), one of the high-melting materials defined at lines 26-27 on page 12 of the specification instant application as being appropriate for use as the material of the shielding portion. Ooaeh et al. does not, however, explain how the shielding portion is joined to the cooling portion. The interposition of a low-melting material between two high-melting materials is a well-known method of connecting metal components, as can be seen in the article on soldering from Encyclopedia Brittanica. It would therefore have been obvious to a person having ordinary skill in the art to use this well-known method to join Ooaeh et al.'s shielding and cooling portions. In Figure 7 and the related discussion at lines 57-64 in column 12, Oooaeh et al. teaches to use the bias portion to control the trajectories of the electrons so as to form a crossover (CO) between the bias portion and the anode portion. While Ooaeh et al. is silent about whether or not the electrons strike the anode, Lempert et al. teaches at lines 62-72 in column 1 that the incidence of an electron beam on the edges of an aperture in an electron gun cause damage to the aperture members and that this damage can be avoided by moving the crossover of the electron beam. Lempert et al. does not specifically mention damage to the anode, but Pfeiffer et al. teaches at lines 1-39 in column 11 and related Figure 5A that "the typical, widely employed triode gun", described at lines 3-19 as comprising a cathode (1), an anode (5), and a grid or Wehnelt (or bias) electrode (3), forms a crossover (7) between the bias electrode (3) and the anode (5) and the resulting electron beam has a diameter smaller than the aperture in the anode so that electrons pass through this aperture without striking the anode. It would have been obvious to a person having ordinary skill in the art to use "the typical, widely employed triode gun" configuration described by Pfeiffer et al. as

the unspecified configuration required by Ooaeh et al. in order to avoid the damage described by Lempert et al. to the anode (which constitutes an aperture member).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ooaeh et al., Lempert et al., and Pfeiffer et al. as applied to claims 1, 4, and 10-12 above, and further in view of Takigawa. While Ooaeh et al. does describe some embodiments of the invention that use a cathode formed with a flat surface (see for example Figures 7 and 8A), the embodiment that uses the shielding (or beam-cutting-off aperture 411) does not place any restrictions on the shape of the cathode used in the apparatus. Takigawa et al., on the other hand, teaches that an electron beam with a highly controllable diameter at a beam crossover point can be formed using a cathode (emitter) having a hemispherical (i.e. rounded) top surface. See lines 24-32 in column 3. It would have been obvious to a person having ordinary skill in the art to use Takigawa's cathode having a hemispherical top surface as the cathode in the Ooaeh et al./Lempert et al./Pfeiffer et al. apparatus discussed above in order to achieve the controllable beam diameter taught by Takigawa.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ooaeh et al., Lempert et al., and Pfeiffer et al. as applied to claims 1, 4, and 10-12 above, and further in view of Beisswenger et al. Ooaeh et al. does not go into any great detail about the structure of the shielding portion (411) or teach about detecting electrons becoming incident on the shielding portion and using this detection result to control an application voltage, but Beisswenger et al. teaches that by forming such a shielding portion (restrictor M) with an incident portion on which the emission electrons become incident, and a tilt portion tilting with respect to an incident direction of the incident emission electrons, and said incident portion has a member that confines the emission electrons irradiating said tilt portion, a portion (Faraday cage FK) of the shielding

portion (M) acts as a detecting portion which detects the electrons becoming incident on said shielding portion, and a control portion (the control circuit illustrated in Figure 2 of Beisswenger et al.) which controls an application voltage on the basis of a detection result of said detecting portion can be provided to keep the electron beam emitted by the beam generator highly steady. It would have been obvious to a person having ordinary skill in the art to form Ooaeh et al.'s shielding portion in the shape disclosed by Beisswenger et al. in order to make use of the control circuit taught by Beisswenger et al. to keep the electron beam emitted highly steady in the manner taught by Beisswenger et al.

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ooaeh et al., Lempert et al., Pfeiffer et al., and Beisswenger et al. as applied to claim 3 above, and further in view of Leung et al. At lines 40-53 in column 12, Leung et al. teaches that when a cooling portion is used with a Faraday cage (210) to measure the current of an electron beam, it must include an insulator and deionized water (another term for the "insulating pure water" defined at lines 5-6 on page 14 of the specification of the instant specification as one of two possible cooling media that serve as the antecedent basis for the "cooling medium having a predetermined resistance" in claim 5) should be passed through the cooling portion. It would have been obvious to a person having ordinary skill in the art to apply Leung et al.'s teachings on how to cool Faraday cages when Beisswenger et al.'s combination shielding portion and Faraday cage was used as the shielding portion to be cooled in the Ooaeh et al./Lempert et al./Pfeiffer et al. apparatus.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ooaeh et al., Lempert et al., and Pfeiffer et al. as applied to claims 1, 4, and 10-12 above, and further in view of Hamaguchi et al. While Ooaeh et al. discloses only a single electron gun, Hamaguchi et

al. teaches that a plurality of electron guns (10) can be provided in a single chamber and that additional electrodes (slit-deflecting unit 15) to which voltages are applied can be provided between the anode (13) and the shielding portions (slit covers 11). It would have been obvious to a person having ordinary skill in the art to provide a plurality of Ooaeh et al.'s electron guns in a single chamber and to provide the additional electrodes taught by Hamaguchi et al. in order to produce more semiconductor devices more rapidly in the manner discussed by Hamaguchi et al. at paragraph [0006].

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ooaeh et al., Lempert et al., Pfeiffer et al., and Hamaguchi et al. as applied to claims 7 and 8 above, and further in view of Beisswenger et al. as applied to claim 3 above. Since Hamaguchi et al. teaches to control each of the electron guns individually by means of individual controllers (120), it would have been obvious to a person having ordinary skill in the art to use a plurality of Beisswenger et al. shielding portions with their related detecting and controlling portions to control each of the Ooaeh et al. electron guns independently of each other and thereby keep each of them steady.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

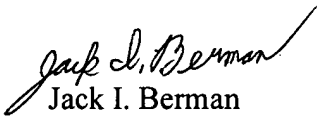
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on M-F (8:30-6:00) with every second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jack I. Berman
Primary Examiner
Art Unit 2881

jb
11/15/05